

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Unlicensed Use of the 6 GHz Band)	ET Docket No. 18-295
)	
Expanding Flexible Use in Mid-Band Spectrum)	GN Docket No. 17-183
Between 3.7 and 24 GHz)	
)	

COMMENTS OF STARRY, INC.

Starry, Inc. (Starry)¹ submits these comments in support of the Federal Communications Commission’s (FCC or Commission) proposal to make the 6 GHz band available for unlicensed operations.² The unlicensed ecosystem is a significant driver of economic activity across many sectors of the U.S. economy, and is the primary medium through which consumers access the internet.³ As a technology company that relies on IEEE 802.11 standardized radios in its own technology stack and as a service provider that leverages unlicensed spectrum to deliver in-home connectivity, Starry believes that unlocking this valuable spectrum for new unlicensed operations will further stimulate the unlicensed ecosystem and help drive additional broadband deployment.

Unlicensed spectrum plays an essential role in the U.S. and global communications infrastructure. It powers in-home internet access, is the backbone communications layer for the Internet-of-Things, has an installed base of *billions* of devices, and serves as a barrier-free means of spectrum access.⁴ Effectively extending the hugely successful 5 GHz unlicensed band to include the 6 GHz band provides an easy way to upgrade and enhance unlicensed access for businesses, consumers, and innovators.

¹ Starry, Inc., is a Boston- and New York-based technology company that is utilizing millimeter waves to re-imagine last-mile broadband access as an alternative to fixed wireline broadband. Starry is currently deploying its proprietary fixed 5G wireless technology in the Boston, Washington, DC, Los Angeles, and Denver areas, with plans to expand to our presence to additional U.S. cities in 2019.

² *Unlicensed Use of the 6 GHz Band, Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, ET Docket No. 18-295, GN Docket No. 17-183, Notice of Proposed Rulemaking, FCC No. 18-147, (rel. Oct. 24, 2018) (*6 GHz NPRM*).

³ *Id.* at ¶¶ 5-6.

⁴ *Id.* at ¶ 5.

Within the context of the *6 GHz NPRM*, we generally support the Commission's proposals and make two suggestions aimed at improving the viability of the 6 GHz band specifically for last-mile broadband: 1) the Commission should permit higher-gain and steerable antennas for outdoor point-to-multipoint operations along with higher power fixed client devices in all areas; and 2) the Commission should allow access points at any elevation and permit the Automated Frequency Coordination (AFC) systems to incorporate an elevation dimension. Combined, these small enhancements will ensure the 6 GHz band can be leveraged to the greatest extent possible to bring innumerable benefits to consumers and the U.S. economy.⁵

I. THE COMMISSION SHOULD PERMIT HIGHER-GAIN MODERN ANTENNAS TO SUPPORT POINT-TO-MULTIPOINT LAST-MILE DEPLOYMENTS IN ALL AREAS, AND PERMIT HIGHER POWER FIXED CLIENT DEVICES

Unlicensed and lightly-licensed spectrum is the backbone of last-mile wireless broadband. Hundreds of small operators scattered across the country in both rural and urban environments rely on low-barrier access spectrum to provide critically-needed broadband services to consumers.⁶ Because they do not have to spend billions of dollars at a spectrum auction, these providers can serve small, but important customer bases, and can devote their capital directly to deploying service. The 5 GHz band is now a workhorse within the fixed wireless industry, and the Commission should ensure that the 6 GHz band can help bring much needed additional capacity to existing and new fixed wireless deployments across the U.S.

Specifically, the Commission should allow higher gain antennas on access points under the control of an AFC and client devices in the U-NII-5 and U-NII-7 bands, without limitation on whether the devices are in urban or rural areas. Unlicensed systems deployed by wireless broadband providers, enterprises, and other sophisticated users rely on modern devices that employ advanced antenna technology. Allowing higher gain antennas, including in point-to-multipoint modes, increases the efficiency of spectrum use in a given area, and improves the quality of the wireless link between an access point and client device. Rather than discouraging directionality and steerability, the Commission should encourage it for the 6 GHz band.

⁵ According to one study, the economic surplus created by unlicensed spectrum is at least \$452 billion, and unlicensed spectrum contributed \$29 billion to GDP. Telecom Advisory Services, LLC, *A 2017 Assessment of the Current & Future Economic Value of Unlicensed Spectrum in the United States* (2018), http://wififorward.org/wp-content/uploads/2018/06/WFF_Katz_Economic_Report_2018.pdf.

⁶ See *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket No. 17-199, 2018 Broadband Deployment Report, 33 FCC Rcd 1660, 1681 ¶ 50 (2018).

Higher gain antennas and point-to-multipoint deployments are essential to fixed wireless providers. Higher gains increase directionality and extend the distance between an access point and a client device, allowing one base station to serve more end users (and thereby driving down the unit cost and improving the economics of a system). Point-to-multipoint has the same effect – instead of blasting energy omni-directionally, a fixed provider using a steerable point-to-multipoint antenna is capable of directing the energy in specific locations, freeing up airspace that would otherwise be needlessly occupied.

In seeking comment on allowing higher-gain antennas, the Commission specifically limits its inquiry to the use of higher gain antennas in rural or underserved areas, but provides no explanation for why such a limitation would be beneficial.⁷ This artificial geographic limitation is unnecessary. If an access point is under the control of an AFC, the AFC will adequately be able to protect the fixed point-to-point links in the area and coordinate the higher power gain accordingly. The Commission should trust in its decision to rely on modern spectrum sharing and coordination techniques to manage access to the 6 GHz band, and should avoid adding unnecessary static restrictions that can and should be appropriately delegated to the devices and the AFC. Furthermore, we point out that whether an area is “rural” – however defined – has no direct correlation on whether the spectrum will be congested or fewer licensed point-to-point systems will be susceptible to interference, and “unserved” areas exist all over the country, including in urban areas. We suggest the Commission avoid this complication and simply allow higher gain antennas if appropriately coordinated through the AFC.

Similarly, the Commission should permit higher power fixed client devices if under control of an access point coordinated through an AFC. The Commission could allow conducted power of +18 dBm and up to 18 dB of antenna gain before power must be reduced. This would result in greater overall directionality of the transmission of energy from a client device. Most importantly, it would improve the viability of the band for fixed wireless and other types of high capacity fixed links. In many cases, it is the uplink from a client device to an access point that is the limiting factor on a provider’s ability to serve a customer. By increasing the power and of a client device – especially coupled with increased gain and point-to-multipoint operation on the access point side of the link – the Commission can ensure that the 6 GHz band will help improve

⁷ 6 GHz NPRM at ¶ 79.

broadband access across the country. Again, these higher power operations will be subject to – and under the control of – an AFC system that will be appropriately coordinating the higher power, and protecting fixed point-to-point links accordingly.

II. THE COMMISSION SHOULD PERMIT FIXED ACCESS POINTS AND CLIENT DEVICES AT ANY ELEVATION, AND SHOULD PERMIT AFC SYSTEMS TO INCLUDE AN ELEVATION DIMENSION

We support the Commission’s decision to largely leave the development of the specification and functionality of AFC systems to the private sector. As seen through the development of Spectrum Access Systems for the Citizens Broadband Radio Service, if the Commission sets broad requirements, the technology and provider ecosystem will take on the task of filling out the technical and operational details.⁸ Within this strategy, we urge the Commission to allow the AFC systems to include an elevation variable instead of relying on an arbitrary assumed deployment height for all systems.

While the Commission is correct that determining elevation is more difficult and less standardized than the lat/long of a specific installation, it is not impossible.⁹ Some providers may opt to use professional installers, who can provide a precise elevation for an installation and therefore maximize the availability and use of spectrum for that provider. Other installations may rely on available but less accurate GPS elevation, the variation of which can be accommodated in an AFC system that calculates spectrum availability and protection within a range for the less-precise elevation variable.

Furthermore, specifying a standard elevation would effectively act as an overly-restrictive height limitation that will impede fixed wireless providers’ ability to deploy at realistic elevations. There is frequently limited space available on commercially-available vertical assets. Therefore, for any given deployment, a provider may have to accept and plan around whatever elevation on a vertical asset is available, not what is required under FCC rules or even what is optimal for the deployment.

⁸ See 47 C.F.R. § 96.53 *et seq.*; CBRS WInnforum Standards, <https://cbrs.wirelessinnovation.org>.

⁹ See 6 GHz NPRM at ¶ 52.

III. CONCLUSION

Starry strongly supports the Commission's quick action to make the 6 GHz band available for unlicensed operation, and largely supports the proposals in the *6 GHz NPRM*. We believe that by allowing higher gain antennas and higher power client devices, along with deployment flexibility at any elevation, the Commission can ensure that this band will become part of the critical unlicensed backbone powering the U.S. wireless ecosystem, including for fixed wireless broadband.

Respectfully submitted,
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